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File: USPT

Jul 25, 1972

DOCUMENT-IDENTIFIER: US 3680002 A
TITLE: MICROSTRIP MICROWAVE OSCILLATORS

Abstract Text (1):

A microwave oscillator in microstrip form is single-tuned simultaneously at both fundamental and second harmonic frequencies to enhance efficient generation of fundamental frequency output voltage. The circuit, manufacturable by printed circuit techniques, comprises a microstrip cavity formed by a strip resonator and solid state oscillator device. The orthogonally arranged output circuit is capacitively coupled for fundamental frequency impedance matching and includes a coupling line terminated by an open-ended-line filter network which passes fundamental frequency energy while reflecting second harmonic energy. An application is LSA-mode operation of transferred-electron diodes.

Brief Summary Text (3):

There is need for microwave oscillators in microstrip form in order to realize the advantages of small size, low weight, and low cost fabrication by printed circuit techniques. Microstrip oscillators are appropriate to the use of solid-state oscillator devices such as the transferred electron diode and the avalanche diode, and are compatible with microwave microelectronic integrated circuit employing alumina substrates. Typical applications for these oscillators are as phase-locked microwave sources for active element phased-array antennas, and as power sources in solid-state power combiners.

Brief Summary Text (7):

A microwave oscillator in microstrip form is tuned simultaneously at both the fundamental and second harmonic frequencies to obtain increased efficiency of generation of fundamental frequency output voltage in a circuit employing a solid state oscillator device such as a transferred-electron diode or avalanche diode. In the oscillator circuit, a microstrip cavity is formed by a strip resonator and the solid state oscillator device connected between the strip resonator and a ground plane, with means for applying a bias voltage to the device. An orthogonally extending microstrip output circuit includes a coupling line that is series capacitor coupled to the strip resonator in alignment with the oscillator device and is terminated by a low pass filter network which passes fundamental frequency energy while reflecting second harmonic energy. By tuning the oscillator at both the fundamental and second harmonic frequency, there is applied to the oscillator device, in addition to the bias voltage, a total rf voltage waveform that is the sum of the fundamental and second harmonic voltages.